

Amendments to the Claims

1. (cancelled)

2. (currently amended) A method for accurately positioning a patient for radiotherapy and/or radiosurgery, comprising the following steps:

- a) the patient is pre-positioned with respect to a linear accelerator;
- b) after the patient has been pre-positioned, at least two x-ray images of the patient and/or one of the parts of his body in the vicinity of a radiation target point are produced from different respective recording angles on a single image recorder;
- c) the x-ray image is spatially localized;
- d) at least one reconstructed image, corresponding to each x-ray image and deriving from a three-dimensional patient scan data set, is produced, the reconstructed images giving the desired image content of the respective x-ray image when the patient is correctly positioned;
- e) the reconstructed images and the x-ray images are superimposed, and a positioning error is determined electronically and/or with computer guidance; and
- f) the position of the patient is corrected by way of the determined positioning error; and

~~The method as set forth in claim 1,~~ wherein the x-ray images are produced in defined positions offset with respect to the location at which the patient is pre-positioned and, outside of the ~~radiation irradiating~~ range of the linear accelerator, the reconstructed images being produced with the same offset.

3. (original) The method as set forth in claim 2, wherein the defined offset is compensated for by correcting the position of the patient.

4. (currently amended) A method for accurately positioning a patient for radiotherapy and/or radiosurgery, comprising the following steps:

- a) the patient is pre-positioned with respect to a linear accelerator;

b) after the patient has been pre-positioned, at least two x-ray images of the patient and/or one of the parts of his body in the vicinity of a radiation target point are produced from different respective recording angles on a single image recorder;

c) the x-ray image is spatially localized;

d) at least one reconstructed image, corresponding to each x-ray image and deriving from a three-dimensional patient scan data set, is produced, the reconstructed images giving the desired image content of the respective x-ray image when the patient is correctly positioned;

e) the reconstructed images and the x-ray images are superimposed, and a positioning error is determined electronically and/or with computer guidance; and

f) the position of the patient is corrected by way of the determined positioning error; and

~~The method as set forth in claim 1~~, wherein the x-ray images are produced at an oblique angle on the single image recorder spatially arranged horizontally, and projected back onto each respectively defined normal plane, the corresponding reconstructed images being likewise produced in these normal planes.

5. (currently amended) The method as set forth in claim 4, wherein the patient is pre-positioned by means of a navigation and tracking system with computer and camera guidance, with the aid of artificial arrangements of markers on the patient and on the devices for treatment.

6. (currently amended) The method as set forth in claim 4, wherein the patient is pre-positioned using markings on the patient's skin, natural landmarks or laser markings.

7. (currently amended) The method as set forth in claim 4, wherein the x-ray images and the reconstructed images are superimposed by way of natural structures present in the x-ray images and the reconstructed images.

8. (currently amended) The method as set forth in claim 4 4, wherein the x-ray images and the reconstructed images are superimposed by way of artificial structures present in the x-ray images and the reconstructed images.

9. (previously presented) The method as set forth in claim 7, wherein the x-ray images and the reconstructed images are superimposed by marking them manually and sliding them over one another on a computer display unit.

10. (previously presented) The method as set forth in claim 7, wherein the x-ray images and the reconstructed images are superimposed by automatic, computer-guided image fusion.

11. (currently amended) The method as set forth in claim 4 4, wherein the reconstructed image/s is/are produced as:

- Digitally Reconstructed Radiographs (DRRs);
- Digitally Composited Radiographs (DCRs);
- MIP images,

or as any two-dimensional image reconstruction from a three-dimensional patient scan data set.

12. (currently amended) The method as set forth in claim 4 2, wherein the position of the patient is altered by shifting the patient table using markers on at least one of the patient and patient table.

13. (currently amended) The method as set forth in claim 4 2, wherein the position of the patient is corrected by manually guiding the table.

14. (currently amended) A method for accurately positioning a patient for radiotherapy and/or radiosurgery, comprising the following steps:

- a) the patient is pre-positioned with respect to a linear accelerator;

b) after the patient has been pre-positioned, at least two x-ray images of the patient and/or one of the parts of his body in the vicinity of a radiation target point are produced from different respective recording angles on a single image recorder;

c) the x-ray image is spatially localized;

d) at least one reconstructed image, corresponding to each x-ray image and deriving from a three-dimensional patient scan data set, is produced, the reconstructed images giving the desired image content of the respective x-ray image when the patient is correctly positioned;

e) the reconstructed images and the x-ray images are superimposed, and a positioning error is determined electronically and/or with computer guidance; and

f) the position of the patient is corrected by way of the determined positioning error; and

~~The method as set forth in claim 1,~~ wherein a multitude of images over a breathing cycle are produced from each angle, each time x-ray image are produced from the different recording angles, the breath-dependent movement of the markings arranged on the patient or in the vicinity of the radiation target being tracked by a navigation and tracking system with computer and camera guidance and referenced with the dynamic shifting of the target point directly or indirectly visible in the images, in order to take into account the breath-dependent shifting of the target point during irradiation.

15. (currently amended) A device for accurately positioning a patient for radiotherapy and/or radiosurgery, comprising:

a) at least two x-ray sources with which x-ray images of the patient and/or one of the parts of his body in the vicinity of the radiation target point may be produced from respectively different recording angles;

b) a means by which the x-ray image may be spatially ~~localised~~ localized;

c) a means by which at least one reconstructed image, corresponding to each x-ray image and deriving from a three-dimensional patient scan data set, may be produced;

d) a means by which the reconstructed images and the x-ray images are superimposed, the positioning error being determined electronically and/or with

computer guidance by way of particular landmarks and/or the intensity gradient or the contours in the two images; and

e) a means by which the position of the patient is corrected with respect to a linear accelerator by way of the determined positioning error, and wherein

f) the device comprises only one image recorder, with which the x-ray images of both x-ray sources are produced, the image recorder being positioned on a support for a movable patient table.

16. (previously presented) The device as set forth in claim 15, wherein the image recorder is an image intensifier or detector.

17. (cancelled)

18. (currently amended) The device as set forth in claim ~~17~~ 15, wherein the image recorder ~~may be moved~~ is movable vertically together with the patient table and the support, while it is securely arranged horizontally.

19. (currently amended) The device as set forth in claim ~~17~~ 15, wherein the two x-ray sources are arranged respectively over a patient table and to the side.

20. (currently amended) The device as set forth in claim ~~17~~ 15, wherein the two x-ray sources are arranged respectively beneath a patient table, and to the side, the image recorder being positioned above the patient table.

21. (currently amended) A method for accurately positioning a patient for radiotherapy and/or radiosurgery, comprising the steps of:

pre-positioning the patient with respect to a linear accelerator;

after pre-positioning of the patient, using a single image recorder with an x-ray source to produce at least two x-ray images of at least a portion of the patient in the vicinity of a radiation target point at different respective recording angles;

spatially localizing the x-ray images to obtain respective localized x-ray images;

reconstructing from a three-dimensional patient scan data set reconstructed images respectively corresponding to the localized x-ray images; and

using the reconstructed images and the respective localized x-ray images to determine a positional error between the radiation target point in the reconstructed images and the radiation target point in the localized x-ray images, and

wherein the patient is supported on a table that is shifted relative to the linear accelerator in opposite directions first to position the patient between the single image recorder and a first x-ray source for producing a first one of the x-ray images and then to position the patient between the single image recorder and a second x-ray source for producing a second one of the x-ray images.

22. (previously presented) The method as set forth in claim 21, further comprising adjusting the relative positions of the patient and linear accelerator to compensate for the positional error.

23. (cancelled)

24. (currently amended) The method as set forth in claim 4 2, wherein the positional error is determined by superimposing the x-ray images and the reconstructed images using image fusion.

25. (previously presented) A device for accurately positioning a patient relative to a linear accelerator for radiotherapy and/or radiosurgery, comprising:

an image recorder;

first and second x-ray sources cooperative sequentially with the image recorder to produce x-ray images of in the vicinity of a radiation target point at different respective recording angles; and

a patient table for supporting the patient such that at least a portion of the patient can be located in the vicinity of a radiation target point, the table being controllably shiftable in a first direction for positioning at least a portion of the patient between the image recorder and the first x-ray source for producing a first one of the x-ray images

and then in a second direction to position the patient between the image recorder and a second x-ray source for producing a second one of the x-ray images.

26. (previously presented) The device as set forth in claim 25, comprising a computer system for spatially localizing the x-ray images to obtain respective localized x-ray images, for reconstructing from a three-dimensional patient scan data set reconstructed images respectively corresponding to the localized x-ray images, and for using the reconstructed images and the respective localized x-ray images to determine a positional error between the radiation target point in the reconstructed image and the radiation target point in the respective localized x-ray image.